# SPACE ACRES WATER USERS ASSOCIATION (PWS#6030050)
# SOURCE WATER ASSESSMENT FINAL REPORT

**September 10, 2002**

## State of Idaho
## Department of Environmental Quality

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## Executive Summary

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency (EPA) to assess every source of public drinking water for its relative sensitivity to contaminants regulated by the act. This assessment is based on a land use inventory of the designated assessment area and sensitivity factors associated with the wells and aquifer characteristics.

This report, *Space Acres Water Users Association, Pocatello, Idaho* describes the public water system (PWS), the boundaries of the zones of water contribution, and the associated potential contaminant sources located within these boundaries. This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. **The results should <u>not be</u> used as an absolute measure of risk, and they should <u>not be</u> used to undermine public confidence in the water system.**

Space Acres Water Users Association (PWS # 6030050) is a community water system. The drinking water system consists of two wells (Well #1S and Well #2N). The wells serve approximately 30 persons through 12 connections.

The potential contaminant sources within the delineation capture zone include a underground storage tank (UST) site, a wastewater land application (WLAP) site operated by the City of Pocatello, a Group 1 Site (site that show elevated levels of contaminants and are not within the priority one areas), and a geothermal mine. Additionally, Interstate 15 and Highway 91 are transportation corridors that cross the delineation. If an accidental spill occurred from these corridors, inorganic chemical (IOCs; i.e. nitrates) contaminants, volatile organic chemical (VOCs; i.e. ethylene-dibromide) contaminants, synthetic organic chemical (SOCs; i.e. atrazine) contaminants, or microbial contaminants (i.e. coliform bacteria) could be added to the aquifer system. Other sources identified that may contribute to the overall vulnerability of the water sources were businesses within the delineated areas that may be considered potential contaminant sources. A complete list of the potential contaminant sources is provided with this assessment.

For the assessment, a review of laboratory tests was conducted using the Idaho Drinking Water Information Management System (DWIMS) and the State Drinking Water Information System (SDWIS). Total coliform bacteria were detected in the distribution system in October and November 1993 and August 1999. The IOCs, fluoride and nitrate have been detected in the drinking water, but at concentrations below the maximum contaminant level (MCL) for each chemical. There have been no VOCs or SOCs detected in the drinking water.

The capture zone for the wells intersects a priority area for the VOC, tetrachloroethylene (PCE). The MCL for PCE is 0.005 mg/L. The organic priority area is where greater than 25% of the wells in the area show levels greater than 1% of the primary standard or other health standards. In addition, the capture zone for the wells intersects a priority area for nitrates. The nitrate priority area is where greater than 25% of the wells show nitrate concentrations greater than 5.0 mg/l.

Final susceptibility scores are derived from equally weighting system construction scores, hydrologic sensitivity scores, and potential contaminant/land use scores. Therefore, a low rating in one or two categories coupled with a higher rating in other categories results in a final rating of low, moderate, or high susceptibility. With the potential contaminants associated with most urban and heavily agricultural areas, the best score a well can get is moderate. As different wells can be subject to various contamination settings, separate scores are given for each type of contaminant. The final susceptibility rankings for the Space Acres Water Users Association wells were automatically rated high for each category due to the presence of a roadway within 50 feet of the wells. Regardless of the default setting, though, the final susceptibility rankings for the wells were high for IOCs, VOCs, SOCs, and microbial contaminants.

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a "pristine" area or an area with numerous industrial and/or agricultural land uses that require surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources. If the system should need to expand in the future, new well sites should be located in areas with as few potential sources of contamination as possible, and the site should be reserved and protected for this specific use.

An effective drinking water protection program is tailored to the particular local drinking water protection area. A community with a fully developed drinking water protection program will incorporate many strategies. For Space Acres Water Users Association, drinking water protection activities should continue efforts aimed at keeping the distribution system free of microbial contaminants that may affect the drinking water quality. If microbial problems arise and/or continue, the water system may want to consider the addition of a disinfection system. Furthermore, drinking water protection activities should focus on correcting any deficiencies outlined in the sanitary survey (an inspection conducted every five years with the purpose of determining the physical condition of a water system's components and its capacity). The wells should maintain sanitary standards regarding wellhead protection. Also, any new sources that could be considered potential contaminant sources in the wells' zones of contribution should also be investigated and monitored to prevent future contamination. No potential contaminants (pesticides, paint, fuel, cleaning supplies, etc.) should be stored or applied within 50 feet of the wells. Land uses within most of the source water assessment area are outside the direct jurisdiction of Space Acres Water Users Association. Therefore, partnerships with state and local agencies, industrial and commercial groups should be established to ensure future land uses are protective of ground water quality. Educating the public about source water will further assist the system in its monitoring and protection efforts.

Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. A strong public education program should be a primary focus of any drinking water protection plan. Public education topics could include household hazardous waste disposal methods, proper lawn and garden care, and the importance of water conservation to name but a few. There are multiple resources available to help water systems implement protection programs, including the Drinking Water Academy of the EPA. Drinking water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture and the Bannock County Soil and Water Conservation District. As major transportation corridors intersect the delineation (such as Interstate 15 and Highway 91), the Idaho Department of Transportation should be involved in protection efforts.

A system must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (i.e. zoning, permitting) or non-regulatory in nature (i.e. good housekeeping, public education, specific best management practices). For assistance in developing protection strategies please contact the Pocatello Regional Office of the Idaho Department of Environmental Quality or the Idaho Rural Water Association.

# SOURCE WATER ASSESSMENT SPACE ACRES WATER USERS ASSOCIATION, POCATELLO, IDAHO

## Section 1. Introduction - Basis for Assessment

The following sections contain information necessary to understand how and why this assessment was conducted. **It is important to review this information to understand what the ranking of this source means.** A map showing the delineated source water assessment area and the inventory of significant potential sources of contamination identified within that area are contained in this report. The list of significant potential contaminant source categories and their rankings used to develop this assessment is also attached.

### Level of Accuracy and Purpose of the Assessment

The Idaho Department of Environmental Quality (DEQ) is required by the U.S. Environmental Protection Agency (EPA) to assess over 2,900 public drinking water sources in Idaho for their relative susceptibility to contaminants regulated by the Safe Drinking Water Act. This assessment is based on a land use inventory of the delineated assessment area, sensitivity factors associated with the wells, and aquifer characteristics. All assessments must be completed by May of 2003. The resources and time available to accomplish assessments are limited. Therefore, an in-depth, site-specific investigation to identify each significant potential source of contamination for every public water system is not possible. **This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. The results should <u>not be</u> used as an absolute measure of risk and they should <u>not be</u> used to undermine public confidence in the public water system (PWS).**

The ultimate goal of the assessment is to provide data to local communities to develop a protection strategy for their drinking water supply system. DEQ recognizes that pollution prevention activities generally require less time and money to implement than treatment of a public water supply system once it has been contaminated. DEQ encourages communities to balance resource protection with economic growth and development. The decision as to the amount and types of information necessary to develop a drinking water protection program should be determined by the local community based on its own needs and limitations. Wellhead or drinking water protection is one facet of a comprehensive growth plan, and it can complement ongoing local planning efforts.

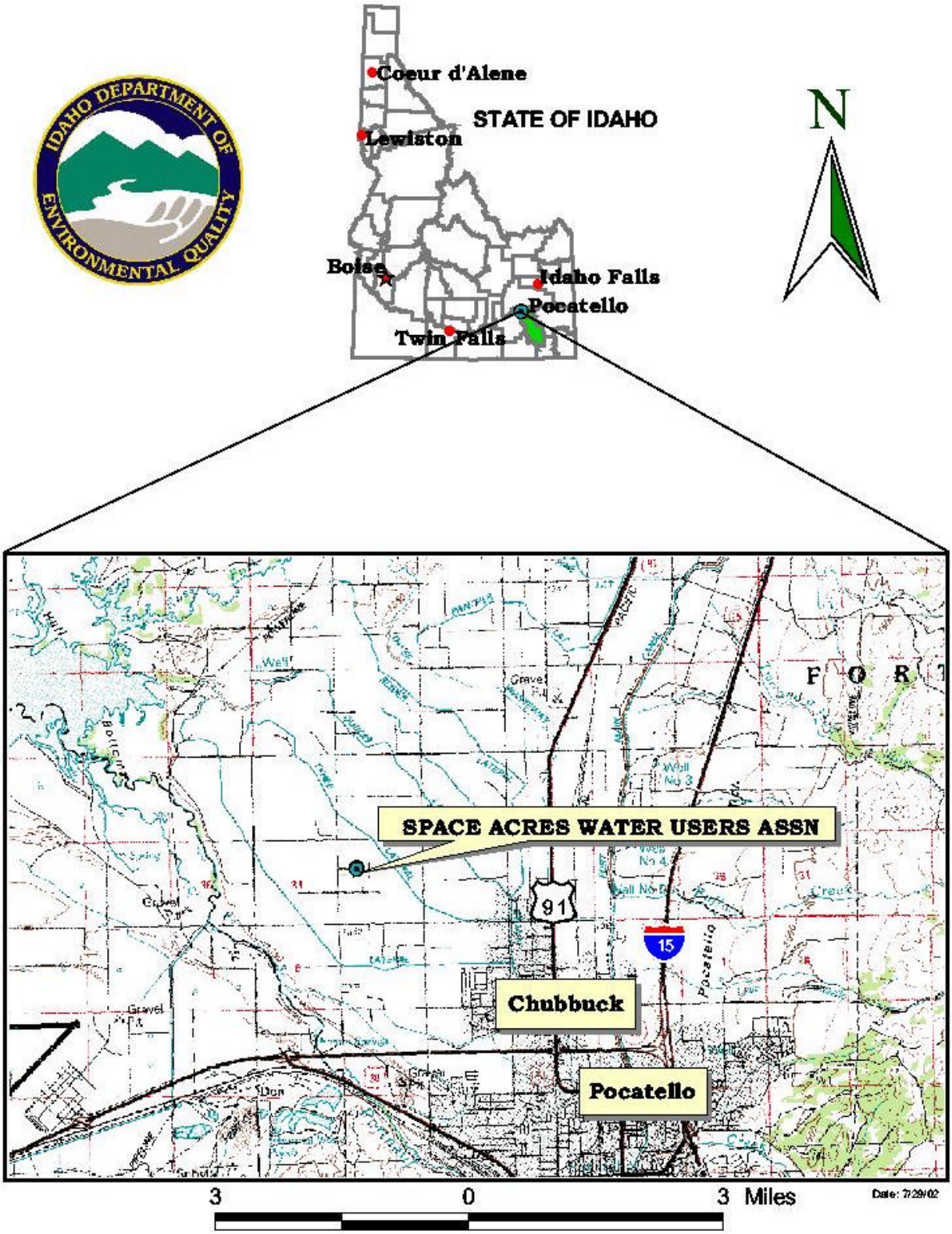
## Section 2. Conducting the Assessment

### General Description of the Source Water Quality

Space Acres Water Users Association (PWS# 6030050) is classified as a community water system and is located two miles northwest of Chubbuck (Figure 1). The drinking water system consists of two wells (Well #1S and Well #2N). The wells serve approximately 30 persons through 12 connections.

Total coliform bacteria were detected in the distribution system in October and November 1993 and August 1999. The inorganic chemicals (IOCs), fluoride and nitrate have been detected in the drinking water, but at concentrations below the maximum contaminant level (MCL) for each chemical.

**FIGURE 1 - Geographic Location of Space Acres Water Users Association, Bannock County**
**PWS 6030050**



There have no volatile organic chemicals (VOCs) or synthetic organic chemicals (SOCs) detected in the drinking water.

**Defining the Zones of Contribution—Delineation**

The delineation process establishes the physical area around a well that will become the focal point of the assessment. The process includes mapping the boundaries of the zone of contribution into time-of-travel zones (zones indicating the number of years necessary for a particle of water to reach a pumping well) for water in the aquifer. Washington Group International (WGI) was contracted by DEQ to define the public water system's zones of contribution. WGI used a refined computer model approved by the EPA in determining the 3-year (Zone 1B) and 6-year (Zone II) Time-of-Travel (TOT) for water associated with the East Margin Area of the Eastern Snake River Plain (ESRP) hydrologic province in the vicinity of the Space Acres Water Users Association. The computer model used site specific data, assimilated by WGI from a variety of sources including well logs (when available), operator records, and hydrogeologic reports. A summary of the hydrogeologic information from the WGI report is provided below.

**Hydrogeologic Conceptual Model**

The East Margin Area encompasses 821 square miles, representing approximately 8 percent of the total area of the ESRP hydrologic province. The majority of the East Margin Area is within Bingham County, with small areas occurring in Bannock, Bonneville, and Power counties.

The regional ESRP aquifer is the most significant aquifer in the East Margin Area and consists primarily of basalt of the Quaternary-aged Snake River Group. However, additional water-bearing units are used for water supply along the margin of the ESRP. In order of decreasing age, the most significant aquifers in the Michaud Flats area are bedded rhyolite (volcanic rock) of the Tertiary-aged Starlight Formation and Quaternary-aged gravels of a low relief plain formed by running water (pediment), basalt of the Big Hole Formation, and stream deposits of the Sunbeam Formation (see Jacobson, 1982, p. 7, and Corbett, et al., 1980, pp. 6-10). A few shallow domestic wells in the central Michaud Flats area also are completed in Michaud Gravel, which is the shallow water-table aquifer. The American Falls Lake Beds Formation (AFLB) confines the deeper aquifers and averages 80 feet in thickness in the central Michaud Flats area (Jacobson, 1984, p. 6). The AFLB pinches out in the eastern Michaud Flats area near the Portneuf River, effectively combining the shallow and deep stream deposits into a single water table aquifer (Bechtel, 1994, p. 2-2). Other aquifers in the East Margin Area include fractured quartzite that has been developed near Blackfoot, stream deposits near the cities of Firth and Basalt.

PWS wells in the East Margin Area of the ESRP province produce water from five different aquifers: the Regional Eastern Snake River Plain aquifer, three alluvial (or stream deposited) aquifers (Eastern Michaud Flats, Firth/Basalt, and Gibson Terrace/Pocatello Bench) and a quartzite aquifer (Blackfoot).

**Regional Eastern River Plain Aquifer**

The ESRP is a northeast trending basin located in southeastern Idaho. The 10,000 square miles of the plain are primarily filled with highly fractured layered Quaternary-aged basalt flows of the Snake River Group, which are between (intercalated) layers of rocks formed by sediment deposition (sedimentary) along the margins (Garabedian, 1992, p. 5). Quaternary-aged basalts are estimated to be 100 to 1,500 feet thick, with the majority of the area in the range of 100 to 500 feet thick (Whitehead, 1992, Plate 3). Individual basalt flows range from 10 to 50 feet thick, averaging 20 to 25 feet thick (Lindholm, 1996, p. 14). Basalt is thickest in the central part of the eastern plain and thins toward the margins. Whitehead (1992, p. 9) estimates the total thickness of the flows to be as great as 5,000 feet. A thin layer (0 to 100 feet) of windblown and stream-produced sediments overlies the basalt. The plain is bounded on the northeast by rocks of the Yellowstone Group (mainly rhyolite) and Idavada Volcanics to the southwest. These rocks may also underlie the plain (Garabedian, 1992, p. 5). Granite of the Idaho batholith borders the plain to the northwest, along with sedimentary rocks and rocks changed by heat and/or pressure (metamorphic) (Cosgrove et al., 1999, p. 10). The Snake River flows along part of the southern boundary and is the only drainage that leaves the plain. A high degree of connectivity with the regional aquifer system is displayed over much of the river as it passes through the plain. However, some reaches are believed to be perched or separated from the main ground water by unsaturated rock, such as the Lewisville-to-Shelly reach. Rivers and streams entering the plain from the south are tributary to the Snake River. With the exception of the Big and Little Wood rivers, rivers entering from the north vanish into the basalts of the Snake River Plain aquifer that have a higher ability to transmit water.

The layered basalts of the Snake River Group host one of the most productive aquifers in the United States. The aquifer is generally considered unconfined, yet may be confined locally because of interbedded clay and dense unfractured basalt (Whitehead, 1992, p. 26). Whitehead (1992, p. 22) and Lindholm (1996, p.1) report that well yields of 2,000 to 3,000 gal/min are common for wells open to less than 100 feet of the aquifer. Transmissivities obtained from test data in the upper 100 to 200 feet of the aquifer range from less than 0.1 square feet per second ($ft^2$/sec) to 56 $ft^2$/sec ($1.0x10^4$ to $4.8x10^6$ $ft^2$/day; Garabedian, 1992, p. 11, and Lindholm, 1996, p. 18). Lindholm (1996, p. 18) estimates aquifer thickness to range from 100 feet near the plain's margin to thousands of feet near the center. Models of the regional aquifer have used values ranging from 200 to 3,000 feet to represent aquifer thickness (Cosgrove et al., 1999, p.15).

Regional ground water flow is to the southwest paralleling the basin (Cosgrove et al., 1999; deSonneville, 1972, p. 78; Garabedian, 1992, p. 48; and Lindholm, 1996, p. 23). Reported water table gradients range from 3 to 100 ft/mile and average 12 ft/mile (Lindholm, 1996, p. 22). Gradients steepen at the plain's margin and at discharge locations. The estimated effective ratio of the rock's open space volume to its total volume range from 0.04 to more than 0.25 (Ackerman, 1995, p.1, and Lindholm, 1996, p.16).

The majority of aquifer recharge results from surface water irrigation activities (incidental recharge), which divert water from the Snake River and its tributaries (Ackerman, 1995, p. 4, and Garabedian, 1992, p. 11) and locally from canal leakage. Natural recharge occurs through stream losses, direct precipitation, and tributary basin underflow.

Aquifer discharge occurs primarily as seeps and springs on the northern wall of the Snake River canyon near Thousand Springs and near American Falls and Blackfoot (Garabedian, 1992, p.17). To a lesser degree, discharge also occurs through pumping and underflow.

The East Margin Area is among the most transmissive regions of the regional aquifer, therefore it has a higher ability to transmit water. A transmissivity of 21 $ft^2$/sec was used to represent the upper 200 feet of the regional aquifer in the East Margin Area in the three-dimensional USGS ground water flow model (Garabedian, 1992, Plate 6). The equivalent hydraulic conductivity or the rate at which water can move through permeable material is 9,072 feet per day (ft/day). This value is consistent with the range of hydraulic conductivity (9,500 to 11,708 ft/day) calculated using data from a constant-rate aquifer test conducted in 1981 (Jacobson, 1982, p. 23). This range was calculated by dividing the estimated transmissivity (228,000 to 281,000 $ft^2$/day) by the perforated interval of the observation well (24 feet). The geometric mean hydraulic conductivity based on analysis of specific capacity data from PWS wells (135 ft/day) is significantly lower.

A published water table map of the Upper Snake River Basin (IDWR, 1997, p. 9) indicates that the ground water flow direction in the ESRP aquifer in the East Margin Area is similar to that depicted at the regional scale (e.g., Garabedian, 1992, Plate 4).

Recharge from precipitation and surface water irrigation in the East Margin Area ranges from less than 10 to more than 20 inches per year (Garabedian, 1992, Plate 8). The low end of the range applies to the area near Blackfoot, while the high end applies to the area on the west side of American Falls Reservoir near Aberdeen.

Kjelstrom (1995, p. 13) reports an annual river loss of 280,000 acre-feet to the regional basalt aquifer for the 27.5-mile Lewisville-to-Shelley reach of the Snake River and 110,000 acre-feet for the 23.5-mile Shelley-to-Blackfoot reach. Annual river gains of 1,900,000 acre-feet for the 36.6-mile Blackfoot-to-Neeley reach are also estimated (Kjelstrom, 1995, p. 13). A seepage study conducted in the fall of 1980 on the Portneuf River showed a gain of about 560 cubic feet per second ($ft^3$/sec) (405,691 acre-feet) for the 13-mile Pocatello-to-American Falls Reservoir reach (Jacobson, 1982, p. 16). The average flow in the Blackfoot River near the city of Blackfoot is low at Station #13068500 (5.2 $ft^3$/sec; USGS, 2001) compared to the flow in the Snake River near the city of Blackfoot at Station #13069500 (2,900 $ft^3$/sec; USGS, 2001).

The Space Acres Water Users Association wells are completed, or assumed to be completed, in the regional basalt aquifer. Sources of ground water recharge are from surface water irrigation canals in the area and precipitation. The delineated source water assessment area for the Space Acres Water Users Association extends eastward approximately 6 miles (Figure 2). Only a three and six-year TOT could be calculated due to the fact that the delineation abruptly ends at the nearby eastern mountains. The actual data used by WGI in determining the source water assessment delineation areas are available from DEQ upon request.

**Identifying Potential Sources of Contamination**

A potential source of contamination is defined as any facility or activity that stores, uses, or produces, as a product or by-product, the contaminants regulated under the Safe Drinking Water Act. Furthermore, these sources have a sufficient likelihood of releasing such contaminants into the environment at levels that could pose a concern relative to drinking water sources. The goal of the inventory process is to locate and describe those facilities, land uses, and environmental conditions that are potential sources of ground water contamination. Field surveys conducted by DEQ and reviews of available databases identified potential contaminant sources within the delineation areas. Some of these sources include an underground storage tank (UST) site, a wastewater land application (WLAP) site, and a geothermal mine.

It is important to understand that a release may never occur from a potential source of contamination provided best management practices are used at the facility. Many potential sources of contamination are regulated at the federal level, state level, or both to reduce the risk of release. Therefore, when a business, facility, or property is identified as a potential contaminant source, this should not be interpreted to mean that this business, facility, or property is in violation of any local, state, or federal environmental law or regulation. What it does mean is that the potential for contamination exists due to the nature of the business, industry, or operation. There are a number of methods that water systems can use to work cooperatively with potential sources of contamination, such as educational visits and inspections of stored materials. Many owners of such facilities may not even be aware that they are located near a public water supply well.

### Contaminant Source Inventory Process

A two-phased contaminant inventory of the study area was conducted during July of 2002. The first phase involved identifying and documenting potential contaminant sources within Space Acres Water Users Association source water assessment area through the use of computer databases and Geographic Information System (GIS) maps developed by DEQ. The second, or enhanced, phase of the contaminant inventory involved contacting the operator to validate the sources identified in phase one and to add any additional potential sources in the area. This task was undertaken with the assistance of Mr. Dennis Howell. At the time of the enhanced inventory, no additional potential contaminant sources were found within the delineated source water area. A map with well locations, delineated areas, and potential contaminant sources is provided with this report (Figure 2). Each potential contaminant source has been given a unique site number that references tabular information associated with the public water wells (Table 1).

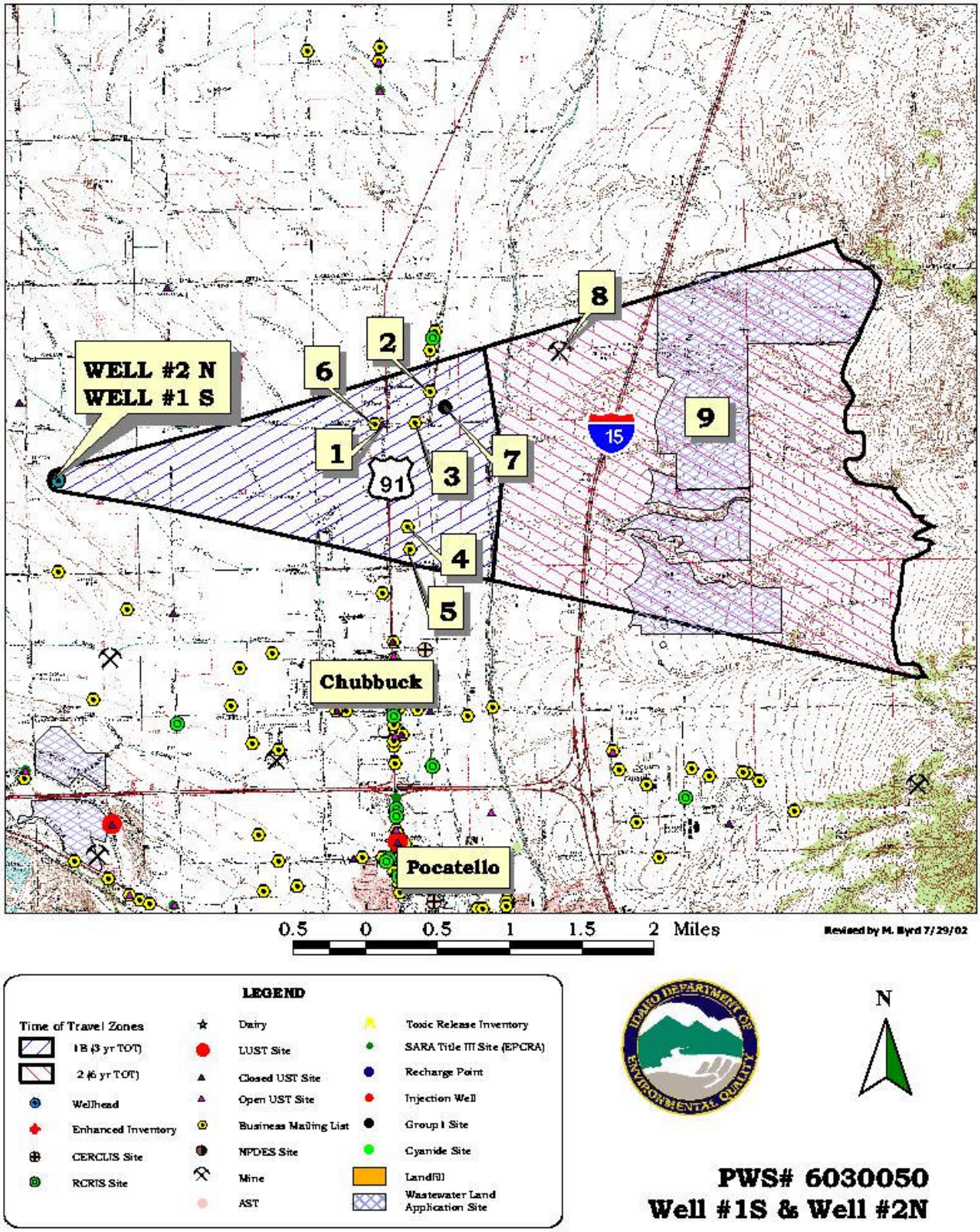
## Section 3. Susceptibility Analyses

The susceptibility of the wells to contamination was ranked as high, moderate, or low risk according to the following considerations: hydrologic characteristics, physical integrity of the wells, land use characteristics, and potentially significant contaminant sources. The susceptibility rankings are specific to a particular potential contaminant or category of contaminants. Therefore, a high susceptibility rating relative to one potential contaminant does not mean that the water system is at the same risk for all other potential contaminants. The relative rankings that are derived for the wells is a qualitative, screening-level step that, in many cases, uses generalized assumptions and best professional judgement. Appendix A contains the susceptibility analysis worksheets. The following summaries describe the rationale for the susceptibility rankings.

### Hydrologic Sensitivity

The hydrologic sensitivity of a well is dependent upon four factors. These factors are surface soil composition, the material in the vadose zone (between the land surface and the water table), the depth to first ground water, and the presence of a 50-foot thick fine-grained zone above the water producing zone of the wells. Slowly draining soils, such as silt and clay, typically are more protective of ground water than coarse-grained soils such as sand and gravel. Similarly, fine-grained sediments in the subsurface, and a water depth of more than 300 feet from the surface, protect the ground water from contamination.

**FIGURE 2 - Space Acres Water Users Assocation**
**Delineation Map and Potential Contaminant Source Locations**




**PWS# 6030050**
**Well #1S & Well #2N**

Hydrologic sensitivity was rated high for Well #1S and moderate for Well #2N (Table 2). This is based upon the moderate to well drained regional soil classification underlying the delineated area as defined by the National Resource Conservation Service (NRCS). Soils that have poor to moderate drainage characteristics have better filtration capabilities than faster draining soils.

For Well #1S, there was insufficient well log information to evaluate the vadose zone composition, the first depth to ground water, and whether there is at least 50 feet of cumulative thickness of low permeability material that could reduce the downward movement of contaminants. If a well log had been available the hydrologic sensitivity score may have been lower.

For Well #2N, the well log indicates the vadose zone is comprised primarily of brown clay. According to the well log, the depth to first ground water was encountered between 88 feet below ground surface (bgs) and 95 feet bgs. Low permeable material (brown clay) was present from 22 feet to 69 feet.

**Well Construction**

Well construction directly affects the ability of the well to protect the aquifer from contaminants. System construction scores are reduced when information shows that potential contaminants will have a more difficult time reaching the intake of the well. Lower scores imply a system that can better protect groundwater. If the casing and annular seal both extend into a low permeability unit then the possibility of cross contamination from other aquifer layers is reduced and the system construction score goes down. If the highest production interval is more than 100 feet below the water table, then the system is considered to have better buffering capabilities. When information was adequate, a determination was made as to whether the casing and annular seals extend into low permeability units and whether current public water system construction standards are met.

The Idaho Department of Water Resources (IDWR) *Well Construction Standards Rules (1993)* require all public water systems (PWS) to follow DEQ standards. IDAPA 58.01.08.550 requires that PWSs follow the *Recommended Standards for Water Works (1997)* during construction. Under current standards, all PWS wells are required to have a 50-foot buffer around the wellhead and if the well is designed to yield greater than 50 gallons per minute (gpm) a minimum of a 6-hour pump test is required. These standards are used to rate the system construction for the well by evaluating items such as condition of wellhead and surface seal, the thickness of the casing, etc. If all criteria are not met, the public water source does not meet the IDWR Well Construction Standards. In this case there was insufficient information available to determine if the wells met the criteria outlined in the IDWR Well Construction Standards.

The system construction score rated high for Well #1S and Well #2N (Table 2). The 1999 sanitary survey (conducted by Southeastern Idaho Health Department) states the wellheads do not have proper sanitary seals for outdoor applications. In addition, the wellheads do not have well casing vents. The purpose of the vent is to vent the space between the casing and the column, which prevents a vacuum from forming when the well turns on and draws down the water table. A vacuum could draw in contamination through joints or leaks in the casing or cause the well to slough.

For Well #1S, there was no well log available to determine whether the well casing and annular seal extend into a low permeability geologic formation. For Well #2N, the well log indicates the annular seal and the well casing extend into gravel material. The well casing heights are adequate, and the wells are located outside of the 100-year floodplain, which may decrease the chance of contaminants being drawn into the drinking water sources by surface water flooding.

## Potential Contaminant Source and Land Use

The potential contaminant sources and land use within the delineated zones of water contribution are assessed to determine the wells' susceptibility. When agriculture is the predominant land use in the area, this may increase the likelihood of agricultural wastewater infiltrating the ground water system. Agricultural land is counted as a source of leachable contaminants and points are assigned to this rating based on the percentage of agricultural land. The predominant land use within the delineated capture zones of Space Acres Water Users Association is irrigated agricultural land.

The potential contaminant sources within the delineation capture zone include an UST site, a WLAP site operated by the City of Pocatello, a Group 1 Site (site that show elevated levels of contaminants and are not within the priority one areas), and a geothermal mine. Also, Interstate 15 and Highway 91 are transportation corridors that cross the delineations. If an accidental spill occurred from these corridors, IOCs, VOCs, SOCs, or microbial contaminants could be added to the aquifer system. Other sources identified that may contribute to the overall vulnerability of the water sources were businesses within the delineated areas that may be considered potential contaminant sources (Table 1).

In terms of potential contaminant sources and land use susceptibility the wells rated high for IOCs (i.e., nitrates), VOCs (i.e. petroleum products), SOCs (i.e., herbicides), and low for microbial contaminants (i.e., fecal coliform).

**Table 1. Space Acres Water Users Assn. (Wells #1S & #2N). Potential Contaminant Inventory**

| Site # | Source Description[1] | TOT Zone (years)[2] | Source of Information | Potential Contaminants[3] |
|---|---|---|---|---|
| | Highway 91 | 0-3 | GIS Map | IOC, VOC, SOC, Microbials |
| 1 | UST site | 0-3 | Database Search | VOC SOC |
| 2 | Construction – Concrete | 0-3 | Database Search | IOC, VOC, SOC |
| 3 | General Construction | 0-3 | Database Search | IOC, VOC, SOC |
| 4 | Gas Company | 0-3 | Database Search | IOC, VOC, SOC |
| 5 | Steel Fabrication | 0-3 | Database Search | IOC, VOC, SOC |
| 6 | Automotive Repair Service | 0-3 | Database Search | IOC, VOC, SOC |
| 7 | Group 1 Site | 0-3 | Database Search | |
| 8 | Geothermal Mine | 3-6 | Database Search | IOC |
| 9 | WLAP | 3-6 | Database Search | IOC |
| | Railroad | 3-6 | GIS Map | IOC, VOC, SOC |
| | Interstate 15 | 3-6 | GIS Map | IOC, VOC, SOC |

**Site #'s are non-sequential**

**[1] WLAP = wastewater land application site, UST = underground storage tank, Group 1 Site = site that show elevated levels of contaminants and are not within the priority one areas**

**[2] TOT = time-of-travel (in years) for a potential contaminant to reach the wellhead**

**[3] IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical**

### Final Susceptibility Rating

A detection of an IOC above a drinking water standard MCL, or any detection of a VOC or SOC at the wellhead, will automatically give a high susceptibility rating to a well despite the land use of the area because a pathway for contamination already exists. Additionally, potential contaminant sources within 50 feet of a wellhead will automatically lead to a high susceptibility rating. Hydrologic sensitivity and system construction scores are heavily weighted in the final scores. Having multiple potential contaminant sources in the 0 to 3-year time of travel zone (Zone 1B) and a large percentage of agricultural land contribute greatly to the overall ranking.

**Table 2. Summary of Space Acres Water Users Assn., Susceptibility Evaluation**

| Drinking Water Source | Susceptibility Scores | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Hydrologic Sensitivity | Potential Contaminant Inventory and Land Use | | | | System Construction | Final Susceptibility Ranking | | | |
| | | IOC | VOC | SOC | Microbials | | IOC | VOC | SOC | Microbials |
| Well #1S | H | H | H | H | L | H | H* | H* | H* | H* |
| Well #2N | M | H | H | H | L | H | H* | H* | H* | H* |

**H = High Susceptibility, M = Moderate Susceptibility, L = Low Susceptibility**
**IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical**
**H* = automatic high rating due to presence of a roadway within 50 feet of wells (sanitary setback = 50 feet)**

### Susceptibility Summary

The final susceptibility ranking for the Space Acres Water Users Association wells were automatically rated high due to the presence of a roadway within 50 feet of the wells (sanitary setback = 50 feet). Regardless of the default setting, though, Wells #1S and #2N would still have rated high for IOC, VOC, SOC, and microbial contaminants.

For both wells, the hydrologic sensitivity and system construction scores rated high. Potential contaminant inventory and land use scores rated high for IOCs, VOCs, and SOCs and low for microbial contaminants for both wells.

## Section 4. Options for Drinking Water Protection

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the source is currently located in a “pristine” area or an area with numerous industrial and/or agricultural land uses that require surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources. If the system should need to expand in the future, new well sites should be located in areas with as few potential sources of contamination as possible, and the site should be reserved and protected for this specific use.

An effective drinking water protection program is tailored to the particular local drinking water protection area. A community with a fully developed drinking water protection program will incorporate many strategies. For Space Acres Water Users Association, drinking water protection activities should continue efforts aimed at keeping the distribution system free of microbial contaminants that may affect the drinking water quality. If microbial problems arise and/or continue, the water system may want to consider the addition of a disinfection system. The water system should continue using disinfection practices to treat the water source. In addition, reverse osmosis can be an effective treatment for inorganic chemical contaminants. In addition, drinking water protection activities should focus on correcting any deficiencies outlined in the sanitary survey. The wells should maintain sanitary standards regarding wellhead protection. Also, any new sources that could be considered potential contaminant sources in the wells' zones of contribution should also be investigated and monitored to prevent future contamination. No potential contaminants (pesticides, paint, fuel, cleaning supplies, etc.) should be stored or applied within 50 feet of the wells. Land uses within most of the source water assessment area are outside the direct jurisdiction of Space Acres Water Users Association. Therefore partnerships with federal, state and local agencies, industrial and commercial groups should be established to ensure future land uses are protective of ground water quality. Educating the public about source water will further assist the system in its monitoring and protection efforts.

Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. A strong public education program should be a primary focus of any drinking water protection plan. Public education topics could include household hazardous waste disposal methods, proper lawn and garden care, and the importance of water conservation to name but a few. There are multiple resources available to help water systems implement protection programs, including the Drinking Water Academy of the EPA. Drinking water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture and the Bannock County Soil and Water Conservation District. As major transportation corridors intersect the delineations (Interstate 15 and Highway 91), the Idaho Department of Transportation should be involved in protection efforts.

A system must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (i.e. zoning, permitting) or non-regulatory in nature (i.e. good housekeeping, public education, specific best management practices). For assistance in developing protection strategies please contact the Pocatello Regional Office of the DEQ or the Idaho Rural Water Association.

**Assistance**

Public water supplies and others may call the following DEQ offices with questions about this assessment and to request assistance with developing and implementing a local protection plan. In addition, draft protection plans may be submitted to the DEQ office for preliminary review and comments.

| | |
|---|---|
| DEQ Pocatello Regional Office | (208) 236-6160 |
| DEQ State Office | (208) 373-0502 |

Website: http://www.deq.state.id.us

Water suppliers serving fewer than 10,000 persons may contact Ms. Melinda Harper (208) 343-7001 or email her at mlharper@idahoruralwater.com. Idaho Rural Water Association, for assistance with drinking water protection (formerly wellhead protection) strategies.

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## POTENTIAL CONTAMINANT INVENTORY LIST OF ACRONYMS AND DEFINITIONS

**AST (Aboveground Storage Tanks) –** Sites with aboveground storage tanks.

**Business Mailing List –** This list contains potential contaminant sites identified through a yellow pages database search of standard industry codes (SIC).

**CERCLIS –** This includes sites considered for listing under the **Comprehensive Environmental Response Compensation and Liability Act (CERCLA)**. CERCLA, more commonly known as Superfund is designed to clean up hazardous waste sites that are on the national priority list (NPL).

**Cyanide Site –** DEQ permitted and known historical sites/facilities using cyanide.

**Dairy –** Sites included in the primary contaminant source inventory represent those facilities regulated by Idaho State Department of Agriculture (ISDA) and may range from a few head to several thousand head of milking cows.

**Deep Injection Well –** Injection wells regulated under the Idaho Department of Water Resources generally for the disposal of stormwater runoff or agricultural field drainage.

**Enhanced Inventory** – Enhanced inventory locations are potential contaminant source sites added by the water system. These can include new sites not captured during the primary contaminant inventory, or corrected locations for sites not properly located during the primary contaminant inventory. Enhanced inventory sites can also include miscellaneous sites added by the Idaho Department of Environmental Quality (DEQ) during the primary contaminant inventory.

**Floodplain –** This is a coverage of the 100-year floodplains.

**Group 1 Sites** – These are sites that show elevated levels of contaminants and are not within the priority one areas.

**Inorganic Priority Area –** Priority one areas where greater than 25% of the wells/springs show constituents higher than primary standards or other health standards.

**Landfill –** Areas of open and closed municipal and non-municipal landfills.

**LUST (Leaking Underground Storage Tank)** – Potential contaminant source sites associated with leaking underground storage tanks as regulated under RCRA.

**Mines and Quarries** – Mines and quarries permitted through the Idaho Department of Lands.)

**Nitrate Priority Area –** Area where greater than 25% of wells/springs show nitrate values above 5 mg/l.

**NPDES (National Pollutant Discharge Elimination System) –** Sites with NPDES permits. The Clean Water Act requires that any discharge of a pollutant to waters of the United States from a point source must be authorized by an NPDES permit.

**Organic Priority Areas –** These are any areas where greater than 25% of wells/springs show levels greater than 1% of the primary standard or other health standards.

**Recharge Point –** This includes active, proposed, and possible recharge sites on the Snake River Plain.

**RCRA –** Site regulated under **Resource Conservation Recovery Act (RCRA)**. RCRA is commonly associated with the cradle to grave management approach for generation, storage, and disposal of hazardous wastes.

**SARA Tier II (Superfund Amendments and Reauthorization Act Tier II Facilities) –** These sites store certain types and amounts of hazardous materials and must be identified under the Community Right to Know Act.

**Toxic Release Inventory (TRI)** – The toxic release inventory list was developed as part of the Emergency Planning and Community Right to Know (Community Right to Know) Act passed in 1986. The Community Right to Know Act requires the reporting of any release of a chemical found on the TRI list.

**UST (Underground Storage Tank) –** Potential contaminant source sites associated with underground storage tanks regulated as regulated under RCRA.

**Wastewater Land Applications Sites** – These are areas where the land application of municipal or industrial wastewater is permitted by DEQ.

**Wellheads –** These are drinking water well locations regulated under the Safe Drinking Water Act. They are not treated as potential contaminant sources.

**NOTE:** Many of the potential contaminant sources were located using a geocoding program where mailing addresses are used to locate a facility. Field verification of potential contaminant sources is an important element of an enhanced inventory..

# APPENDIX A

# Space Acres Water Users Association Susceptibility Worksheets

The final scores for the susceptibility analysis were determined using the following formulas:

1) VOC/SOC/IOC Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.22)

2) Microbial Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.375)

Final Susceptibility Scoring:

0 - 5 Low Susceptibility

6 - 12 Moderate Susceptibility

³ 13 High Susceptibility

Ground Water Susceptibility Report  Public Water System Name: SPACE ACRES WATER USERS ASSOCIATION  WELL #2 N
Public Water System Number 6030050  9/10/02 1:24:36 PM

| 1. System Construction | | SCORE | | | |
|---|---|---|---|---|---|
| Drill Date | 7/23/73 | | | | |
| Driller Log Available | YES | | | | |
| Sanitary Survey (if yes, indicate date of last survey) | YES | 1999 | | | |
| Well meets IDWR construction standards | NO | 1 | | | |
| Wellhead and surface seal maintained | NO | 1 | | | |
| Casing and annular seal extend to low permeability unit | NO | 2 | | | |
| Highest production 100 feet below static water level | NO | 1 | | | |
| Well located outside the 100 year flood plain | YES | 0 | | | |
| Total System Construction Score | | 5 | | | |
| **2. Hydrologic Sensitivity** | | | | | |
| Soils are poorly to moderately drained | NO | 2 | | | |
| Vadose zone composed of gravel, fractured rock or unknown | NO | 0 | | | |
| Depth to first water > 300 feet | NO | 1 | | | |
| Aquitard present with > 50 feet cumulative thickness | YES | 0 | | | |
| Total Hydrologic Score | | 3 | | | |
| **3. Potential Contaminant / Land Use - ZONE 1A** | | IOC Score | VOC Score | SOC Score | Microbial Score |
| Land Use Zone 1A | IRRIGATED CROPLAND | 2 | 2 | 2 | 2 |
| Farm chemical use high | NO | 0 | 0 | 0 | |
| IOC, VOC, SOC, or Microbial sources in Zone 1A | YES | YES | YES | YES | YES |
| Total Potential Contaminant Source/Land Use Score - Zone 1A | | 2 | 2 | 2 | 2 |
| **Potential Contaminant / Land Use - ZONE 1B** | | | | | |
| Contaminant sources present (Number of Sources) | YES | 6 | 7 | 7 | 1 |
| (Score = # Sources X 2 ) 8 Points Maximum | | 8 | 8 | 8 | 2 |
| Sources of Class II or III leacheable contaminants or | YES | 2 | 7 | 1 | |
| 4 Points Maximum | | 2 | 4 | 1 | |
| Zone 1B contains or intercepts a Group 1 Area | YES | 2 | 2 | 0 | 0 |
| Land use Zone 1B | Greater Than 50% Irrigated Agricultural Land | 4 | 4 | 4 | 4 |
| Total Potential Contaminant Source / Land Use Score - Zone 1B | | 16 | 18 | 13 | 6 |
| **Potential Contaminant / Land Use - ZONE II** | | | | | |
| Contaminant Sources Present | YES | 2 | 2 | 2 | |
| Sources of Class II or III leacheable contaminants or | YES | 1 | 1 | 1 | |
| Land Use Zone II | 25 to 50% Irrigated Agricultural Land | 1 | 1 | 1 | |
| Potential Contaminant Source / Land Use Score - Zone II | | 4 | 4 | 4 | 0 |
| Cumulative Potential Contaminant / Land Use Score | | 22 | 24 | 19 | 8 |
| **4. Final Susceptibility Source Score** | | 13 | 13 | 12 | 10 |
| **5. Final Well Ranking** | | High | High | High | High |

Ground Water Susceptibility Report  Public Water System Name: SPACE ACRES WATER USERS ASSOCIATION  WELL #1 S
Public Water System Number 6030050  9/10/02 1:24:36 PM

| 1. System Construction | | SCORE | | | |
|---|---|---|---|---|---|
| Drill Date | unknown | | | | |
| Driller Log Available | NO | | | | |
| Sanitary Survey (if yes, indicate date of last survey) | YES | 1999 | | | |
| Well meets IDWR construction standards | NO | 1 | | | |
| Wellhead and surface seal maintained | NO | 1 | | | |
| Casing and annular seal extend to low permeability unit | NO | 2 | | | |
| Highest production 100 feet below static water level | NO | 1 | | | |
| Well located outside the 100 year flood plain | YES | 0 | | | |
| Total System Construction Score | | 5 | | | |
| **2. Hydrologic Sensitivity** | | | | | |
| Soils are poorly to moderately drained | NO | 2 | | | |
| Vadose zone composed of gravel, fractured rock or unknown | YES | 1 | | | |
| Depth to first water > 300 feet | NO | 1 | | | |
| Aquitard present with > 50 feet cumulative thickness | NO | 2 | | | |
| Total Hydrologic Score | | 6 | | | |
| **3. Potential Contaminant / Land Use - ZONE 1A** | | IOC Score | VOC Score | SOC Score | Microbial Score |
| Land Use Zone 1A | IRRIGATED CROPLAND | 2 | 2 | 2 | 2 |
| Farm chemical use high | YES | 0 | 0 | 0 | |
| IOC, VOC, SOC, or Microbial sources in Zone 1A | YES | YES | YES | YES | YES |
| Total Potential Contaminant Source/Land Use Score - Zone 1A | | 2 | 2 | 2 | 2 |
| **Potential Contaminant / Land Use - ZONE 1B** | | | | | |
| Contaminant sources present (Number of Sources) | YES | 6 | 7 | 7 | 1 |
| (Score = # Sources X 2 ) 8 Points Maximum | | 8 | 8 | 8 | 2 |
| Sources of Class II or III leacheable contaminants or | YES | 2 | 7 | 1 | |
| 4 Points Maximum | | 2 | 4 | 1 | |
| Zone 1B contains or intercepts a Group 1 Area | YES | 2 | 2 | 0 | 0 |
| Land use Zone 1B | Greater Than 50% Irrigated Agricultural Land | 4 | 4 | 4 | 4 |
| Total Potential Contaminant Source / Land Use Score - Zone 1B | | 16 | 18 | 13 | 6 |
| **Potential Contaminant / Land Use - ZONE II** | | | | | |
| Contaminant Sources Present | YES | 2 | 2 | 2 | |
| Sources of Class II or III leacheable contaminants or | YES | 1 | 1 | 1 | |
| Land Use Zone II | 25 to 50% Irrigated Agricultural Land | 1 | 1 | 1 | |
| Potential Contaminant Source / Land Use Score - Zone II | | 4 | 4 | 4 | 0 |
| Cumulative Potential Contaminant / Land Use Score | | 22 | 24 | 19 | 8 |
| **4. Final Susceptibility Source Score** | | 16 | 16 | 15 | 13 |
| **5. Final Well Ranking** | | High | High | High | High |